



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460**

OFFICE OF CHEMICAL SAFETY AND POLLUTION PREVENTION/OFFICE OF PESTICIDE PROGRAMS

MEMORANDUM

DATE: March 6, 2017

SUBJECT: Science Review in support of registration of end-use product, RF2258 SCR Granules, containing 4.25 % w/w (S)-Methoprene as active ingredient.

Decision Number: 524230
DP Number: 437511
EPA File Symbol Number: 89459-OL
Chemical Class: Biochemical
PC Code: 105402
CAS Number: 65733-16-6
Active Ingredients: (S)-Methoprene
Tolerance Exemptions: 40 CFR 810.1033
MRID Numbers: 501202-01 through 501202-13


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3/7/2017

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3/7/2017

ACTION REQUESTED

Central Garden & Pet Company, Co. is requesting registration of a new mosquito larvicide, RF2258 SCR Granules. In support of this action, the registrant has submitted product specific chemistry data in MRIDs 501202-01 and 501202-02; Tier I Acute Mammalian Toxicity data requirements are addressed in MRIDs 501202-03 through 501202-08, and product performance data is provided in MRIDs 489851-09 through 501202-13. In addition, the registrant has submitted copies of product label, and signed CSF dated, Dec. 1st, 2016, for Agency review.

BACKGROUND INFORMATION

RF2258 SCR Granules is an Insect Growth Regulator (IGR), intended to control mosquito larvae, including those species that vector West Nile Virus, Dengue, Chikungunya and Zika viruses. The product label claims residual activity against mosquito larvae up to 35 days when applied at rates ranging from 2.5 to 20 lbs / acre (5.6 to 11.2 kg / ha), depending of depth of water column, density of vegetation and organic matter. Within this range, the lower rates should be applied to shallow water columns between < 6 to 12 inches with minimal vegetation and organic matter. Within the recommended range, higher rates are recommended when water depth is > 1 ft and/or vegetation and organic matter are heavy. The label recommends to double the highest rate for every foot of water above 2 ft. The product is intended for application at any stage of larval development or between 7 to 15 days pre-hatch or pre-flood. One application can prevent adult emergence from several subsequent flooding events. The actual length of control depends on the frequency of flooding events. Application sites include crops and no-crop areas that support development of mosquito larvae.

RECOMMENDATIONS AND CONCLUSIONS

1. Product chemistry: Acceptable, pending resolution of the following deficiency:

The registrant needs to provide data on 12-months Storage Stability and Corrosion Characteristics. These data are required for all end-use products according to 40 CFR §158.2070.

MRID 501202-01 is Acceptable.

MRID 501202-02 is Acceptable pending resolution of the deficiency identified above.

2. Tier I Toxicity: Acceptable.

All mammalian toxicity data requirements have been adequately addressed. The product is classified as toxicity category IV. Rationale addressing acute inhalation study in MRID 501202-05 is adequate

to support waiving product specific inhalation study. The rationale is based on the low inhalation toxicity of S-Methoprene ($LC_{50} = 5.19 \text{ mg/L}$), and the large size of its granules ($>3,000 \mu\text{m}$). Particles $<100 \mu\text{m}$ made up 0.160% of the formulation, and particles $<5 \mu\text{m}$ made up 0.00152%.

The listed MRIDs are acceptable:

501202-03: Acute Oral Toxicity/OPPTS 870.1100

501202-04: Acute Dermal Toxicity/OPPTS 870.1200

501202-05: Acute Inhalation Toxicity/OPPTS 870.1300

501202-06: Acute Eye Irritation/OPPTS 870.2400

501202-07: Acute Dermal Irritation/OPPTS 870.2500

501202-08: Skin Sensitization/OPPTS 870.2600

4. Product Performance: Acceptable.

MRIDs 501201-09 and 501202-10 are acceptable. Data in these volumes support efficacy claim that the product is effective against several mosquito species, *Culex quinquefasciatus*, *Anopheles quadrimaculatus*, *Ochlerotatus taeniorhynchus*, *Culex quinquefasciatus*, including *Aedes albopictus* and *Aedes aegypti*, the vectors of Zika, Dengue, and Chikungunya. However, the product is effective up to 35 days depending of mosquito specie and application rates. Efficacy of the product against *Ae. aegypti* (EI $> 90\%$), the main vector of these viruses, lasted up to 35 days at application rates of 5 lb/Acre and above, in water depth of 12 – 24 inches. However, at a lower application rate of 2.5 lb/Acre in 4 inches of water, the product was effective (EI $> 90\%$) for 21 days only (Table 4). Consequently, efficacy claim for 35 days against Zika is unsupported at application rates below the minimum 5 lb/Acre, in water depth of 12 – 24 inches. Therefore, the label should specify period of efficacy of the product on each mosquito specie at different application rates or rather, state the most conservative length of efficacy for all species based on results from *Aedes aegypti* study.

STUDY SUMMARIES

Product Chemistry

Refer to Confidential Appendix for data on Product Composition, Manufacturing Process and discussion on Formation of Impurities.

TABLE 1. Physical and Chemical Properties for RF2258 SCR Granules			
Guideline Reference No./Property		Description of Result	Methods
830.6302	Color	Light grey @ 20 °C	Munsell Book of color SOP AN-75.01 / ASTM D-1535
830.6303	Physical State	Solid	Visual inspection SOP AN-77
830.6304	Odor	Fruity like	Olfactory inspection SOP AN-76.01
830.6315	Flammability	N/A (the product doesn't contain combustible liquids)	N/A
830.6317	Storage Stability	Not addressed	Not addressed
830.6319	Miscibility	N/A (The product is not emulsifiable liquid to be diluted with petroleum solvents)	N/A
830.6320	Corrosion Characteristics	Not Addressed	Not addressed
830.7000	pH	N/A	N/A
830.7100	Viscosity	N/A (the product is not a liquid)	N/A
830.7300	Density/Relative Density/Bulk Density	959 g/ml @ 20 °C	CIPAC MT 159

Data from MRID 501202-02

Mammalian Toxicity

TABLE 2. Toxicological Characterization of RF2258 SCR Granules

<u>Study Type/OPPTS Guideline</u>	<u>LD₅₀/LC₅₀/Results</u>	<u>Toxicity Category</u>	<u>MRID</u>
Acute Oral Toxicity/OPPTS 870.1100	5,000 mg/kg in rats	IV	501202-03
Acute Dermal Toxicity/OPPTS 870.1200	5,050 mg/kg in rabbits	IV	501202-04
* Acute Inhalation Toxicity/OPPTS 870.1300	Requested study waiver	Not breathable particles	501202-05*
Acute Eye Irritation/OPPTS 870.2400	Minimally irritant	IV	501202-06
Acute Dermal Irritation/OPPTS 870.2500	slightly irritant	IV	501202-07
Skin Sensitization/OPPTS 870.2600	Not a skin sensitizer	IV	501202-08

* MRID 501202-05: Rationale is provided in lieu of acute inhalation study. The rationale is based on the low inhalation toxicity of S-Methoprene (LC₅₀ = 5.19 mg/L), and the large size of its granules (>3,000 µm). Particles <100 µm made up 0.160% of the formulation, and particles <5 µm made up 0.00152%.

Product Performance

Efficacy studies, in MRID 501202-09 thru 501202-13, on residual effectiveness of several (S)-Methoprene formulations against several species of mosquito larvae were conducted using 100 gallon tanks (7.2 ft²) to simulate artificial ponds in a commercial green house. All treatments were weighed and applied in a broadcast method to evenly distribute the product over water surface. Environmental conditions throughout the study were maintained at temperature of 80 ° F at night and 95 ° F during the day; photoperiod was kept at 14L:10D. Tanks were filled with non-chlorinated water up to 12 inches, and provided with 2 pounds of Bermuda grass hay for 3 days prior to study initiation. The grass was removed from water surface the 3rd day post larvae introduction. Water levels in each tank were maintained at 12 and 6 inches.

Larvae survivorship was assessed prior to treatment applications. A cohort of 100-200 of 2nd instar larvae was introduced 3 days after filling the tanks, and were assessed for adult emergence 7 days later. Food was provided to ensure larvae growth. Samples of 30 pupae per tank were collected and individually placed on emergence cups with 250 mL water at 14L:10D photoperiod and temperature of 85 ± 5 ° F for pre-test assessment of larvae survivorship.

For evaluation of product performance over time, cohorts of 100-200 of 1st – 2nd instar larvae were added to each treatment at 0, 7, 14, 21, 28 and 35 days after treatment (DAT), and they were sampled after 7 days post-introduction. Samples from each cohort were collected at 7, 14, 21, 28, 35 and 42 days, respectively, or until all treatments had < 30 % emergence inhibition (EI). Samples of 30 pupae per treatment were individually placed in 250 mL emergence cups. The cups were filled with distilled water and kept at 14L:10D photoperiod and temperature of 80° F for quantification of emergence. Total numbers of alive adults (AA), dead adults (DA), dead pupae (DP) were counted. Percent emergence was calculated by the formula:

$$\% \text{ EI} = (\text{DP} + \text{DA}) / (\text{AA} + \text{DA} + \text{DP}) \times 100$$

MRID 501202-09, Large Tank Screen of Methoprene Controlled Release 45 Day Residual Production Scale Up Formulations Against Aedes albopictus Larvae.

Target insect: *Aedes albopictus*

Test substances: GG519- formulation series and Altosid pellets.

Active ingredient: (S)-Methoprene at 4.25 % w/w.

Application rates: 7.5 lb/Acre (561 mg / tank) and 5 lb/ Acre (374 mg / tank).

Experimental design: Randomized Complete Block Design (RCBD)

Treatment replications: 5 reps per treatment.

Sample size: 30 larvae per treatment.

Table 1. Treatments, application rates and water levels:

TREATMENT	RATE PER ACRE	WATER DEPTH
GG519-168A1	7.5 POUNDS/ACRE	6 INCHES
GG519-171B	7.5 POUNDS/ACRE	6 INCHES
GG519-169B	7.5 POUNDS/ACRE	6 INCHES
GG519-192A	5 POUNDS/ACRE	12 INCHES
GG519-192B	5 POUNDS/ACRE	12 INCHES
ALTOSID PELLETS Lot# 6041606	5 POUNDS/ACRE	12 INCHES
UNTREATED CONTROL	N/A	12 INCHES

Results:

All GG519- products were effective (EI > 90%) against *Ae. albopictus* up to 35 days post application at rates of 7.5 lb/ Acre and 5 lb/ Acre in 6 and 12 inches of water depth, respectively. At 35 days, emergence inhibition was > 90 % (Table 2).

Table 2. Mean Percent Emergence Inhibition of *Aedes albopictus* at Specific Days After Treatment (DAT) Following Treatment with GG519 Series Methoprene Larvacide Formulations.

TREATMENT	RATE LB/acre	WATER DEPTH	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
GG519-168A1	7.5	6 inches	100	100	100	100	91.98 a ²	15.96 b
GG519-171B	7.5	6 inches	100	100	100	100	95.96 a	28.62a
GG519-169B	7.5	6 inches	100	100	100	100	91.96 a	16.98 b
GG519-192A	5	12 inches	100	100	100	100	94.62 a	29.98 a
GG519-192B	5	12 inches	100	100	100	100	98.66 a'	37.96 a
ALTOSID PELLET LOT# 6041606	5	12 inches	100	100	100	100	37.98 b	0.66 c

TREATMENT	RATE LB/acre	WATER DEPTH	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
UNTREATED CONTROL		12 inches	0	0	0	0	0.00 c	0.66 b
F_Value			1.3E+3	1.3E+33	1.3E+33	1.3E+33	359.81	46.13±3
Pr>F			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

1. Means based on 30 pupae collected per treatment x 5 replicates.

2. Means in columns followed by the same letter(s) are not statistically different according to Tukey's HSD at $\alpha = 0.05$.

MRID 501202-10, Control of *Aedes aegypti* with RF2258 Larvacide at 2.5, 5, 7.5 and 10 Pounds per Acre.

Efficacy evaluation against *Aedes aegypti* was conducted as described under product performance section, except for the following variations: tanks were filled to a level of 12 and 24 inches of water at the beginning of the study. Water levels in each tank were maintained at 4, 6, 12, and 24 inches throughout the study. Cohorts of 150-200 of 2nd instar larvae were introduced 3 days after filling the tanks, and were assessed for adult emergence 7 days later for pre-test assessment of larvae survivorship.

Target insect: *Aedes aegypti*

Test substances: GG519- formulation series and Altosid pellets.

Active ingredient: (S)-Methoprene at 4.25 % w/w.

Experimental design: Randomized Complete Block Design (RCBD)

Treatment replications: 5 reps per treatment.

Application rates: All treatments were applied at a pre-measured weight of 187 mg (2.5 lb/Acre), 374 (5 lb/Acre), 561 mg (7.5 lb/Acre), and 748 mg (10 lb/Acre (Table 3).

Sample size: 30 larvae per treatment.

Table 3. Treatments, application rates, and water depths.

TREATMENT	RATE PER ACRE	WATER DEPTH
RF2258 SCR Granules Lot: GG519-192B	2.5 POUNDS/ ACRE	4 INCHES
RF2258 SCR Granules Lot: GG519-192B	5 POUNDS/ ACRE	6 INCHES
RF2258 SCR Granules Lot: GG519-192B	7.5 POUNDS/ACRE	12 INCHES
RF2258 SCR Granules Lot: GGS 19-1928	10 POUNDS/ ACRE	24 INCHES

TREATMENT	RATE PER ACRE	WATER DEPTH
Altosid Pellets Lot# 6041606	10 POUNDS/ ACRE	24 INCHES
UNTREATED CONTROL		24 INCHES

Results:

Efficacy of the product against *Ae. aegypti* (EI > 90 %) lasted up to 35 days at application rates of 5 lb/ Acre and above, in water depth of 12 – 24 inches. At a lower application rate of 2.5 lb/Acre in 4 inches of water, the product was effective (EI > 90%) for 21 days only (Table 4).

Table 4. Mean ¹ percent emergence inhibition of *Aedes aegypti* following RF2258 SCR Granule application in a simulated field environment.

Mean ¹Percent Emergence Inhibition of *Aedes aegypti* at Specific Days After Treatment (DAT)
Following Treatment with RF2258 SCR Granules.

TREATMENT	RATE LB/acre	WATER DEPTH	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
RF2258 SCR Granules Lot# GGS19-192B	2.5	4 inches	100	99.32 a ²	93.98 b	28.62 d	3.98 d	0.00 b
RF2258 SCR Granules Lot# GGS19-192B	5	6 inches	100	100 a	100 a	100 a	95.96 a	31.96 a
RF2258 SCR Granules Lot# GGS19-192B	7.5	12 inches	100	100 a	100 a	100 a	100 a	39.30 a
RF2258 SCR Granules Lot# GGS19-192B	10	24 inches	100	100 a	100 a	94.64 b	89.32 b	29.30 a
ALTOSID PELLET LOT# 6041606	10	24 inches	100	100 a	100 a	87.96 c	77.30 c	4.6 b
UNTREATED CONTROL		24 inches	0.00	0.00 b	0.00 c	0.00 e	1.98 d	0.00 b
F_Value			1.2E+3	21568.5	3664.04	1474.49	1043.47	62.27±2
Pr>F			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

¹- Means based on 30 pupae collected per treatment x 5 replicates.

² Means in columns followed by the same letter(s) are not statistically different according to Tukey's HSD at $\alpha = 0.05$.

MRID 501202-11, *Control of Anopheles quadrimaculatus with RF2258 Larvacide at 2.5, 5, 7.5 and 10 lb/ Acre.*

Efficacy evaluation against *Anopheles quadrimaculatus* was conducted as described under product performance section, except for the following variations: due to the lengthy development of *Anopheles quadrimaculatus* larvae, 3rd instar larvae were employed to allow for emergence inhibition every 7 days from the time of introduction. Cohorts of 150-300 3rd instar larvae were introduced to each treatment at 4, 11, 18, 25, 32, and 46 DAT and sampled after 7 days post-introduction. Samples from each cohort were collected at 7, 14, 21, 28, 35, and 49 days post-treatment, respectively, or until all treatments had < 30 % emergence inhibition (EI).

Target insect: *Anopheles quadrimaculatus*

Test substances: GG519- formulation series and Altosid pellets.

Experimental design: Randomized Complete Block Design (RCBD)

Treatment replications: 5 reps per treatment.

Application rates: All treatments were applied at a pre-measured weight of 187 mg (2.5 lb/Acre), 374 (5 lb/Acre), 561 mg (7.5 lb/Acre), and 748 mg (10 lb/Acre (Table 5).

Table 5. Treatments, application rates, and water depths.

TREATMENT	RATE PER ACRE	WATER DEPTH
RF2258 SCR Granules Lot: GG519-192B	2.5 POUNDS/ACRE	4 INCHES
RF2258 SCR Granules Lot: GG519-192B	5 POUNDS/ACRE	6 INCHES
RF2258 SCR Granules Lot: GG519-192B	7.5 POUNDS/ACRE	12 INCHES
RF2258 SCR Granules Lot: GG519-192B	10 POUNDS/ACRE	24 INCHES
Altosid Pellets Lot# 6041606	10 POUNDS/ACRE	24 INCHES
UNTREATED CONTROL		24 INCHES

Results:

All GG519- products were effective (EI = 90% and above) against *Anopheles quadrimaculatus* up to 35 days post application at rates of 2.5, 5, 7.5 and 10 lb/ Acre in 4 to 24 inches of water depth, respectively (Table 6).

Table 6. Mean¹ Percent Emergence Inhibition of *Anopheles quadrimaculatus* at Specific Days After Treatment (DAT) Following Treatment with RF2258 SCR Granules.

TREATMENT	RATE	WATER	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	49 DAT
	LB/acre	DEPTH						
RF2258 SCR Granules Lot# GG519-192B	2.5	4 inches	100 a ²	100 a	100 a	99.32 a	90.62 b	0.00 a
RF2258 SCR Granules Lot# GG519-192B	5	6 inches	100 a	100 a	100 a	100 a	100 a	0.66 a
RF2258 SCR Granules Lot# GG519-192B	7.5	12 inches	100 a	100 a	100 a	100 a	100 a	0.00 a
RF2258 SCR Granules Lot# GG519-192B	10	24 inches	100 a	100 a	100 a	100 a	97.32 a	1.32 a
ALTOSID PELLET LOT# 6041606	10	24 inches	100 a	100 a	100 a	100 a	87.98 b	0.66 a
UNTREATED CONTROL		24 inches	1.98 b	0.66 b	2.64 b	4.64 b	1.98 c	0.66 a
F_Value			5514.19	22645.8	6217.35	1888.99	730.44	0.15
Pr>F			0.0000	0.0000	0.0000	0.0000	0.0000	0.7050

¹ Means based on 30 pupae collected per treatment x 5 replicates.

² Means in columns followed by the same letter(s) are not statistically different according to Tukey's HSD at $\alpha = 0.05$.

MRID 501202-12, *Control of Ochlerotatus taeniorhynchus with Larvacide at 2.5, 5, 7.5 and 10 Pounds per Acre.*

Efficacy evaluation against *Ochlerotatus taeniorhynchus* was conducted as described under product performance section, except for the following variations: due to the preferred breeding sites of *Ochlerotatus taeniorhynchus*, 1 inch layer of pre-washed play-sand was placed in all tanks 7 days prior to filling with water. Salt was added to bring salinity to 8PPT level. Water levels in each tank were maintained at treatment rate specific depths (4, 6, 12 and 24 inches).

Larvae survivorship was assessed prior to treatment applications. A cohort of 100-200 of 3rd instar larvae was introduced 3 days after filling the tanks, and were assessed for adult emergence 7 days later. All treatments were weighed and applied in a broadcast method to evenly distribute the product across the water surface. One treatment, RF2258, was applied pre-flooding at a rate of 7.5 lb/ Acre, to sand filled petri dishes and placed in the bottom of a sand-lined empty tank at the front of the greenhouse to expose the granules to UV for 15 days in a simulated pre-flood application. All granules associated with the pre-flood were then scattered across the top of the water in their respective study tanks for application.

Target insect: *Ochlerotatus taeniorhynchus* or *Aedes taeniorhynchus*

Test substances: GG519- formulation series and Altosid pellets.

Active ingredient: (S)-Methoprene at 4.25 % w/w.

Application rates: 2, 5, 7.5 and 10 lb/Acre

Experimental design: Randomized Complete Block Design (RCBD)

Treatment replications: 5 reps per treatment.

Sample size: 30 larvae per treatment

Results:

The product was effective (EI > 90%) against larvae of *Ochlerotatus taeniorhynchus* for 35 days when applied at rates ranging from 2.5 to 7.5 lb/ Acre in 4, 6 and 12 inches of water depth, respectively, but not a higher application rate of 10 lb/Acre in 12 inches of water. At that higher rate, efficacy against *O. taeniorhynchus* larvae lasted 28 days. Pre-flood application at 7.5 lb/Acre in 12 inches of water was also effective (EI = 90.64 %) against *O. taeniorhynchus* larvae up to 35 days (Table 7).

Table 7. Mean¹ Percent Emergence Inhibition of *Ochlerotatus taeniorhynchus* at Specific Days After Treatment (DAT) Following Treatment with RF2258 SCRGranules.

TREATMENT	RATE LB/acre	WATER DEPTH	7 DAT	14DAT	21 DAT	28 DAT	35 DAT	42 DAT
RF2258 SCR Granules Lot# GG519-192B	2.5	4 inches	100	100	100 a ²	90.64 b	38.64 e	0.00 d
RF2258 SCR Granules Lot# GG519-192B	5	6 inches	100	100	100 a	100 a	95.28 ab	27.96 b
RF2258 SCR Granules Lot# GG519-192B	7.5 Pre Flood	12 inches	100	100	100 a	100 a	90.64 bc	37.30 a
RF2258 SCR Granules Lot# GG519-192B	7.5	12 inches	100	100	100 a	100 a	100 a	44.64 a
RF2258 SCR Granules Lot# GG519-192B	10	24 inches	100	100	100 a	100 a	88.64 c	12.64 c
ALTOSID PELLET LOT# 6041606	10	24 inches	100	100	97.98 a	89.30 b	69.30 d	3.30 d
UNTREATED CONTROL		24 inches	0.00	0.00	0.66 b	0.00 c	0.00 f	0.00 d
F_Value			1.2E+32	1.2E+32	3929.48	2645.42	727.78	87.68
Pr>F			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

¹ Means based on 30 pupae collected per treatment x 5 replicates.

² Means in columns followed by the same letter(s) are not statistically different according to Tukey's HSD at $\alpha = 0.05$.

MRID 501202-13, Control of *Culex quinquefasciatus* with RF2258 Larvacide at 2.5, 5, 7.5 and 10 lb/ Acre.

Product performance evaluation against *Culex quinquefasciatus* was conducted as already described for other mosquito species. All treatments were applied at a pre-measured weight of 187 mg (2.5 lb/acre), 374(5 lb/acre), 561 mg (7.5 lb/acre), and 748 mg (10 lb/acre) as specified in Table 1.

Table 8. Treatments, application rates, and water depths.

TREATMENT	RATE PER ACRE	WATER DEPTH
RF2258 SCR Granules Lot: GG519-192B	2.5 POUNDS/ACRE	4 INCHES
RF2258 SCR Granules Lot: GG519-192B	5 POUNDS/ACRE	6 INCHES
RF2258 SCR Granules Lot: GG519-192B	7.5 POUNDS/ACRE	12 INCHES
RF2258 SCR Granules Lot: GG519-192B	10 POUNDS/ACRE	24 INCHES
Altosid Pellets Lot# 6041606	10 POUNDS/ACRE	24 INCHES
UNTREATED CONTROL		24 INCHES

Test substances: GG519- formulation series and Altosid pellets.

Active ingredient: (S)-Methoprene at 4.25 % w/w.

Application rates: 2.5, 5, 7.5 and 10 lb/Acre

Experimental design: Randomized Complete Block Design (RCBD)

Treatment replications: 5 reps per treatment.

Sample size: 30 larvae per treatment.

Pre- application Survivorship Test

A cohort of 150-200 of 3rd instar *Culex quinquefasciatus* larvae, per tub, were introduced 3 days after filling of tanks to determine breeding site availability. Emergence rate was assessed 7 days post-introduction. Samples of 30 pupae per tank were collected and placed in emergence cups containing 250 ml distilled water and placed in lab under a 14L-10D photo period at 85 ±5 °F. All tanks had emergence rates of 97% or greater providing validation of test procedure and assuring no contamination from previous treatments.

Emergency Inhibition Test

A cohort of 100-200 1st and 2nd instar larvae were added to each treatment tub at 0, 7, 14, 21, 28, and 35 DAT (days after treatment). Samples from each cohort were collected at 7, 14, 21, 28, 35, and 42 days post-treatment, respectively, or until all treatments had < 30 % emergence inhibition (EI).

Results:

Efficacy (EI > 90%) lasted up to 21 and 28 days post-application at the lower rates of 2.5 and 5 lb/Acre, respectively. At higher rates efficacy lasted up to 35 days at an intermediate rate of 7.5 lb/Acre, and decrease to 28 days at the highest rate of 10 lb/Acre (Table 9).

Table 9. Mean¹ Percent Emergence Inhibition of *Culex quinquefasciatus* at Specific Days After Treatment (DAT) Following Treatment with RF2258 SCR Granules.

TREATMENT	RATE LB/acre	WATER DEPTH	7 DAT	14 DAT	21 DAT	28 DAT	35 DAT	42 DAT
RF2258 SCR Granules Lot# GG519-192B	2.5	4 inches	100	100	95.32 b ²	61.96 c	10.64 c	0.00 d
RF2258 SCR Granules Lot# GG519-192B	5	6 inches	100	100	100 a	99.32 a	88.62 b	19.99 b
RF2258 SCR Granules Lot# GG519-192B	7.5	12 inches	100	100	100 a	100 a	99.32 a	33.33 a
RF2258 SCR Granules Lot# GG519-192B	10	24 inches	100	100	100 a	97.98 a	80.62 b	11.99 c
ALTOSID PELLET LOT# 6041606	10	24 inches	100	100	100 a	88.62 b	18.64 c	0.00 d
UNTREATED CONTROL		24 inches	0.00	0.00	0.00 c	0.00 d	0.66 d	0.00 d
F Value			1.2E+32	1.2E+32	2343.98	588.25	411.16	188.78
Pr>F			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

¹ Means based on 30 pupae collected per treatment x 5 replicates.

² Means in columns followed by the same letter(s) are not statistically different according to Tukey's HSD at $\alpha = 0.05$.

cc: Clara Fuentes, RAL Menyon Adams, BPPD Chron File, IHAD/ARS
FT, PY-S: 03 /06 /17

CONFIDENTIAL APPENDIX

*Confidential Statement of Formula may be entitled to confidential treatment**



Manufacturing process information may be entitled to confidential treatment
